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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/274,194	03/22/1999	JOHN E. LANG	LAM2P266	8105

7590 03/06/2003

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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 03/06/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/274,194

Applicant(s)

LANG, JOHN E.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 20-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobben (US 6,066,569) in view of Chen et al (US 5,700,740).

Tobben discloses a process for manufacturing silicon integrated circuits, note entire reference. A silicon substrate is provided. An organic material free of silicon is deposited over the semiconductor substrate. The material can be parylene. This reads on the applicant's limitation that low dielectric constant material is disposed over a semiconductor substrate. A hard mask material overlies the low dielectric constant layer. The layer may comprise a single layer of silicon oxide or a dual layer of silicon oxide covered by a layer of silicon nitride. The mask layer is covered by a layer of photoresist that has been patterned to provide an opening (Column 3, lines 10-20). An opening is then etched through the mask layer. The workpiece is subjected to an etch to extend the opening only partly through the mask layer. The original photoresist is stripped (column 3, lines 21-37). Tobben also discloses oxygen plasma is normally used for resist stripping (column 3, lines 55-65).

Unlike the claimed invention, Tobben does not disclose a method wherein the photoresist material is removed with dimethyl sulfoxide.

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In a method of fabricating integrated circuits on a semiconductor substrate of silicon, note entire reference, Chen et al teaches a silicon substrate 2 and photoresist film 5 is deposited thereon on and patterned (column 3, lines 30-67). Chen et al also teaches the photoresist is stripped off, either by ashing with an oxygen containing plasma or by using a suitable solvent such as ACT-690, which is photoresist stripper consisting of a mixture of dimethyl-sulfoxide (column 4, ln 25-40). This reads on applicant's limitation of removing the photoresist layer from the over the hard mask layer with dimethyl sulfoxide of a high pressure liquid chromatography (HLPC) grade.

Unlike the claimed invention, neither Tobben nor Chen et al teach a method wherein a high selectivity of the dimethyl sulfoxide of HPLC grade toward a low dielectric constant material of the low dielectric constant layer causes the dimethyl sulfoxide to chemically dissolve the photoresist layer from over the hard mask layer without substantially damaging the low dielectric constant layer. Chen et al does teach the dimethyl sulfoxide chemically dissolved the photoresist layer. Since the dimethyl sulfoxide layer chemically dissolves the photoresist layer and the same process steps are performed, it is inherent that the dimethyl sulfoxide has a high selectivity toward a low dielectric constant material, absent evidence to the contrary.

Chen et al teaches using dimethyl sulfoxide or an oxygen plasma to remove photoresist, this is a teaching that using dimethyl sulfoxide or an oxygen plasma are equivalent methods of removing photoresist. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tobben by using dimethyl sulfoxide to remove the photoresist as taught by Chen et al because substitution of known equivalents for the same purpose is held to be obvious (MPEP 2144.06).

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*Response to Arguments*

3. Applicant's arguments with respect to claims 20-38 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

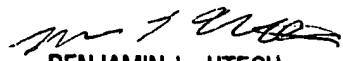
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song  
Examiner  
Art Unit 1765

MJS  
March 3, 2003

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700